

Process for applying a protective coating on the surface of workpieces; alloy and solder used therefor

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Abstract of EP1029629

Workpiece protective coating or repair, by thermal bonding of a pressed strip of metal powder, binder and pressing aid, is new. A protective layer is produced on a workpiece by (a) mixing 3-12 wt.% binder and 1-10 wt.% pressing aid into a metal powder having a single particle size range or a mixture of size ranges with a size distribution of 3-200 μ m; (b) pressing the mixture to strip at 10-150 bars pressure; and (c) bonding the strip onto a metallic component by heat treatment. Independent claims are also included for the following: (i) protective layer production on a workpiece by shaping a solder powder paste or strip to the dimensions of a worn or damaged workpiece surface region, placing the paste or strip in the worn or damaged region and post-treating; (ii) an alloy, having the composition (by wt.) 12-20% Cr, 11-14% Ni, up to 5% Mo and balance Fe, for use in the above process; (iii) a solder material for coating and for producing moldings used in a coating in the above process, comprising copper or a copper alloy containing additions of phosphorus, zinc, silver, germanium, palladium and optionally other elements; and (iv) a solder material for coating and for producing moldings used in a coating in the above process, comprising a nickel solder powder of composition (by wt.) up to 30 (especially 2.5-3.5)% Cr, 0.9-4 (especially 3.0-4.0)% B, 0.6-4.25 (especially 3.7-4.8)% Si, 0.2-5.0 (especially 2.5-3.5)% Fe, 0.05-1% C and balance Ni. Preferred Features: The powder has particle size ranges of 3-30 μ m, 30-75 μ m and/or 75-200 μ m and/or has a particle size distribution of 10-150 μ m, preferably with a maximum particle size of 120 μ m. The mixture is pressed by rolling at below 150 degrees C and 20-100 bars pressure. The strip is bonded to the workpiece surface by welding, arc or laser beam remelting or furnace post-treatment. A worn or damaged workpiece surface region may be repaired by taking an impression of the region using a molding material to form a negative mould which is used to shape a curable paste, the paste being heat treated, after placing on the region, using an induction coil, a laser beam or a furnace, especially an electric furnace, under air, protective gas or vacuum. The solder materials (iii) and (iv) contain 20-60 vol.% hard material powder such as carbides, borides, nitrides, silicides, oxides and/or diamond, especially 50 wt.% fine carbides (WC) of less than 30 μ m particle size.

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